DOCUMENT RESUME

ED 334 154 SP 033 097

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TITLE Changes in Problem Solving Abilities of Students Taught through Case Methods.
PUB DATE Apr 91
NOTE 26p.; Paper presented at the Annual Meeting of the American Educational Research Association (Chicago, IL, April 3-7, 1991).
PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Case Studies; Discussion (Teaching Technique); *Education Courses; Foundations of Education; Higher Education; Methods Research; Preservice Teacher Education; *Problem Solving; Student Attitudes; Student Characteristics; Teacher Education Curriculum; *Teaching Methods
IDENTIFIERS *Case Method (Teaching Technique)

ABSTRACT

To examine the effectiveness of the case method in teacher education, 54 students enrolled in an introductory foundations course were taught together in a weekly lecture and randomly assigned to weekly section meetings taught either by the case method or by discussion of readings. As measured by responses to a problematic situation on the mid-term examination, case methods increased education students' abilities to spot issues in problematic situations, analyze educational dilemmas in sophisticated ways, and identify possible alternatives for action. Case methods were as successful with young undergraduate students as with mature students with greater life experience. The effects of case methods on the ability to analyze classroom situations were inconclusive, however. Almost half the students in the discussion section did not respond to the analytic questions. This result could be either an instructional effect, indicating weaker analytic skills of discussion methods students, or a methodological accident. Students expressed highly positive attitudes toward case methods classes, but no significant differences in attitudes were found between case methods students and discussion methods students when taught in small classes by the same instructor. (Author/IAH)

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Changes in Problem Solving Abilities of Students Taught Through Case Methods

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Paper presented at the American Educational Research Association
April, 1991
Chicago

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Abstract

To examine the effectiveness of the case method in teacher education, 54 students enrolled in an introductory foundations course were taught together in a weekly lecture and randomly assigned to weekly section meetings taught either by the case method or by discussion of readings.

As measured by responses to a problematic situation on the mid-term examination, case methods increased education students' abilities to spot issues in problematic situations, analyze educational dilemmas in sophisticated ways, and identify possible alternatives for action. Case methods were as successful with young undergraduate students as with mature students with greater life experience. The effects of case methods on the ability to analyze classroom situations were inconclusive. Almost half the discussion methods students did not respond to the analytic questions. This result could either be an instructional effect, indicating weaker analytic skills of discussion methods students, or a methodological accident.

Students expressed highly positive attitudes toward case methods classes. But no significant differences in attitudes were found between case methods students and discussion methods students when taught in small classes by the same instructor.

The telephone call came as I graded the final exams.

"You know them things we talked about in class." David began. "the cases? Well. I think I got one. Can I come see you?"

In order to evaluate the effects of teaching education students by the case method. I had randomly divided a class of 54 students into two sections. On Tuesday. all students attended a lecture class. On Thursday. one section of students was taught through an analysis of real world problems. and the other section through conventional discussion of readings. David had landed in the case methods section.

Still in his work overalls. David arrived. He put his baseball cap on the chair and his "case" on the table.

David was worried about a B grade he had received in his major. an industrial arts course. In his view the professor had not stuck to the grading plan in his course syllabus and had graded cooperative group work unfairly. David had been warned that he would not be admitted to the teacher education program if his academic grades were low. But he did not want to create a problem with his industrial arts teacher. who was also his advisor.

David. I was pleased to see. had realized that he was facing a complex. multi-faceted dilemma and that he should be thinking it through and identifying alternatives for action.

We talked about his dilemma using the analytic strategy I had taught students in the case methods section: 1) spot the issues. 2) distinguish between the immediate crisis and the underlying problems. 3) develop strategy alternatives. 4) consider potential consequences. 5) consider other people's perspectives and what may be at stake and at risk.

David began to appreciate that his fundamental problem was not the B grade in his industrial arts course but his low grades in academic courses. It was the academic grades that could keep him out of teacher education.

The case method has long been a cornerstone of professional education in such fields as business and law. A "teaching case" essentially brings a significant and representative professional problem into the classroom and shows students how to think about that problem in sophisticated and expert ways.

Unlike research cases studies, where the researcher interprets and analyzes the situation, teaching cases present problematic situations for students to interpret and analyze. A central goal of the case method is indeed to teach students how to think in complex and fruitful ways about practical situations.

In emphasizing the use of cases to develop interpretive and analytic skills, I do not mean to ignore other possible purposes of case teaching. Advocates of case method teaching also argue that case methods help students learn to apply research and theory to practical situations, increase situational knowledge in professional domains, and develop more realistic and modulated attitudes (Christiansen, 1987; Shulman, 1991; Masoner, 1988).

A good case is also a good story and can educate with similar delicacy. In his delightful article "Educated by Novels", Epstein observes:

> (Stories) give pleasure, convey information, widens experience, and provide flashes of insight....They do not pin the reader to a dogma which he must afterward discover to be inexact...they disengage us from ourselves, they constrain us to the acquaintance of others; and thus show us the web of experience, not as we can see it for ourselves, but with a singular change---that monstrous, consuming ego of ours being, for the nonce, struck out. (Epstein, 1989, p. 35,37).

While proponents of the case method make such claims as to its virtues, criticism of the method has been vigorous for over a hundred years. In 1870, when Christopher Columbus Langdell first introduced the case method into legal education, most law schools rejected it in favor of a lecture and textbook approach (Dente, 1974). While the case method eventually became the preferred and prestigious method of education in schools of law, it has never gained wide acceptance in schools of business despite energetic proselytizing by the Harvard Business School (Vagts, 1977).

Critics of the method argue on a conceptual level that cases are a poor and inefficient way to transmit information and theory and that on-the-job experience is far more effective than vicarious experience in developing problem-solving abilities (Masoner,

1989; Vagts, 1977, Livingston, 1971). Furthermore, on the practical level, developing high quality cases is difficult and expensive.

The debate about the value of case methods in professional education has created a large and urbane literature. What is surprising, in view of the vigor of this debate, is that so few studies have attempted any empirical examination of the claims of the case method. Masoner (1988) has done the field a great service in locating and reviewing any literature that could be construed as an evaluation of case methods. Yet, he found mostly anecdotal evidence, unpublished studies, and a small assortment of unrelated and non-cumulative published studies spanning many professional fields.

In reviewing those studies evaluating the effect of the case method on the development of business decisionmaking skills, Masoner (1988: 65) found mixed results. Three studies showed no advantage to the case method. One compared case methods to a business game (McKenney, 1962) and another to direct experience (McDonald, 1976). The last involved ratings of German executives exposed to case method instruction (Painchaud, 1984). Two other studies, however, showed that business students exposed to case methods did show growth in application skills (Watson, 1975; Fox, 1963).

In the field of education, Masoner (1988) located only two studies of the case method. Comparing the case method with the lecture/discussion method in a social foundations of education course, Butler (1966) found no significant differences in the extent to which students learned the information presented in the course, but case methods appeared to have significant effects upon students' attitudes and perspectives. Comparing the case method with a reading/discussion method in a special seminar for college deans and vice presidents, Fisher (1972) also found that the case had strong effects on administrators' attitudes about institutional change.

In a study of development of education students' problem-solving abilities, Gliessman, Grillo, & Archer (1989) found that education students showed gains in their ability to interpret educational problems when case methods were used, but this study used a number of other educational methods as well so no conclusions can be drawn about the efficacy of the case method.

Too few empirical studies have been done to draw any reasonable conclusions about the effects of case methods in professional education. Many of the studies available suffer from serious technical problems, such as the lack of a control group. Whether results from the field of business generalize to the field of education is not clear. Those of us interested in the potential of case methods in the education of teachers need to develop a research literature subjecting the claims of the case method to empirical test in our own field.

Research Questions

This study explored the effects of the case method in developing education students' abilities to analyze professional problems. I wanted to see if case methods could develop students' skills in spotting the issues in an ill-structured problem domain, framing problems in productive ways, understanding conflicts from the perspectives of different actors, and developing problem solving alternatives.

I also wanted to see if case methods would be effective with young undergraduate education students, as well as with older students who could bring considerable life experience to the case. Case discussions in business schools depend heavily on the contributions of students with considerable real world experience. In teaching cases in education courses previously, I had been concerned about the extent to which the older and more experienced students dominated case discussions.

Finally, I wanted to test the claim that students found education classes taught through the analysis of real-world teaching problems more interesting and intellectually stimulating than education classes taught through discussing readings about educational issues. Would students rate classes taught by case methods higher in student opinion surveys? Would they be more likely to discuss class material with friends and family outside of class?

Method

Sample and Procedure

The 54 students in a required, introductory foundations course, "Diagnosis and Evaluation of Learning" were stratified by class status (undergraduate versus postbaccalaureate student) and randomly assigned either to a section taught by the case method or a section taught by discussion of readings and practical exercises.

All students attended together a weekly lecture covering such topics as educational goals and objectives, connecting students with subject matter, creating equal opportunities for learning, and evaluating student learning through teacher-made and standardized tests.

The case methods section attended a weekly one-hour class meeting which centered on the discussion of a case relevant to the lecture topic. The discussion section attended a weekly one-hour class meeting which centered on the discussion of assigned readings and practical exercises on the construction of educational objectives and tests.

All classes were taught by the same instructor (Kleinfeld), an education professor with over twenty years' teaching experience. Both sections met in the same room in the early afternoon.

In order to decrease Hawthorne effects and increase the generalizability of results to other education classes, students were not told that they were participating in a special study. They were informed that the professor was examining her own teaching and thus might record classes or give them surveys on their perceptions of the class.

The treatment time was short---eight classroom sessions. While a longer period of exposure to case teaching would provide a better evaluation of the method, the shorter period was chosen to equalize learning opportunities between the sections. Students in the discussion methods section were told that the instructor did not have sufficient quantities of copyrighted and expensive copies of Harvard Business School cases for all 54 students, and one section would use these materials during the first half of the course while the other section would use them during the second half.

As I will later describe, a central outcome measure was students' ability to analyze a real-world educational problem centering on grading. I did not want such situations, therefore, to be unfamiliar to students in the discussion section. Thus, students in both sections were exposed early in the course to two case analyses. Students in the discussion method section, however, did not receive extensive experience with cases.

Definition of Case and Case Method Pedagogy

Considerable ambiguity surrounds the question of what constitutes a "case" and "case method teaching." Indeed Dooley and Skinner (1977, p. 277) argue that most discussions of the case method are "largely meaningless (since) the phrase 'case method' embraces such an array of pedagogic practices."

For this reason, it is important to clarify the types of cases used in this study and and the pedagogy used to teach them. The cases were primarily the type the Harvard Business School labels "problem" cases---desciptions of educational dilemmas. Some cases

were drawn from Greenwood and Parkay (1989), others from the education cases published by the Harvard Business School (1989), and others from the University of Alaska cross-cultural case series (Kleinfeld, 1990).

In teaching such cases, I am often taken aback by the great difficulty many education students have in analyzing a problem situation. Many students see problems as no more than common-sense, obvious difficulties. They have not developed the idea that problems are constructed and can be constructed in more and less fruitful ways. Many education students also have little notion of how to think about a dilemma; they come up with nothing more than a quick reaction and a single solution.

For this reason, I have developed a pedagogy for teaching cases that begins with a structured approach showing students explicitly how to analyze problems and progresses to the more fluid case discussions characteristic of case teaching methods at the Harvard Business School. In the case method section, I began by discussing the purposes of case method teaching in developing problem solving skills and the uses of the case method in law and business schools.

When first teaching with cases, I "scaffolded" the case discussion by explicitly asking students to spot the critical issues in the case at hand. As the discussion proceeded, I might put on the board "Alternatives for Action" and ask students to identify possible strategies that the teacher might consider. After students realized that a single crisis could contain many different problems, some immediate and others long-term, and that they needed to think carefully about various actions, case discussions became much more fluid with the class centering on the intriguing issues that particular cases raised.

In addition to class discussions, students wrote two analyses of cases. To help them in the analysis, I provided a set of questions which led them through an analytic process--

the framing of the problems, the spotting of ethical and policy, as well as pedagogical problems, and the identification of strategy alternatives.

This approach to case teaching, I emphasize, begins with more structure than is typical in many versions of the case method. This issue in case teaching---a more structured approach which helps students become aware of and reflective about their problem-solving strategies versus a more fluid approach where problem solving strategies are embedded in a problem context---is a variation of the current debate on the teaching of thinking skills (e.g. Perkins and Salomon, 1989; Prawat, 1991). I essentially began with what Prawat (1991) calls an "embedded approach" in which thinking skills are explicitly taught in the context of subject matter and then moved to an "immersion" approach where thinking skills were not explicitly discussed.

Measures

Analysis of an Educational Dilemma On the mid-term examination, students were given an educational stituation to analyze--- a young and inexperienced teacher caught in a grading dilemma (Greenwood & Parkay, 1989). At least 20 different issues could be identified in the case and at least 10 different strategies for handling the situation.

A coding guide was developed to measure identification of these issues and strategies. Based on the over-all quality of their analyses, students were also given a general rating of their problem-solving skills:

1. Well-developed" problem-solving skills indicated the identification of several issues of various types (pedagogical, ethical, policy), the consideration of several strategies, and strategies which logically related to the analysis of the problem.

2. "Low" problem-solving skills indicated the identification of only one or two issues, one or two strategies, and/or strategies poorly connected to problems.

3. "Moderate" problem-solving skills was used to categorize students at an intermediate level of sophistication---such as students who identified several issues but could come up with few strategies.

Analysis of a Classroom Observation After observing for two days in a classroom, students were asked to describe the classroom and then answer a set of structured questions asking them to 1) analyze the problems facing the teacher, 2) discuss applicable research concepts, and 3) discuss what they had learned about teaching from this observation. A coding guide was constructed measuring the numbers of problems identified, whether or not the students were able to apply relevant research to the classroom, and the number of significant issues students discussed in describing what they had learned.

All measures were coded blind by a graduate students after an inter-rater reliability study indicated greater than 80 percent agreement between coders.

Student Attitudes Toward Instruction After the eight sessions, students completed an anonymous survey measuring attitudes toward the Tuesday lecture and the Thursday case or discussion section. The survey covered such matters as whether they had found each class intellectually stimulating, how often they had been absent, and the number of times they had discussed issues brought up in class with family and friends.

Students also completed the Student Opinion of Instruction, the standard university form that the University of Alaska uses to evaluate instruction. On a six point scale, students were asked to evaluate the entire course on 24 different dimensions. The dimensions most relevant to examining attitudes toward case instruction were: "course as a whole," "course content," and "instructor's effectiveness in teaching the subject matter."

Results and Discussion

Development of Problem-solving Skills

Students taught by the case method approach showed significantly greater ability to analyze an educational problem (Table 1). The following example indicates the enormous variation in students' ability to analyze a real world problem dealing with central concepts of the course ---grading decisions. In this case, "Jan", a young teacher had asked "Frank," her department head, for advice on grading. She had veered from extremely strict tests to students grading themselves and the problem was complicated by confused school policies, politically influential parents, and a teachers' committee responsible for consistent grading.

The majority (65 percent) of discussion group students gave response of this low quality:

> Jan has had some problems alright. Jan started out correctly by discussing the grading policy with Frank. The problem was that Frank was not being specific enough on the school's grading policy. Another problem was that Jan did not have a prepared scoring criteria to present to her class.

This same student offered the following confused analysis of Jan's options:

> Jan had an option of following the schools grading policy or veering off from it. Her options could have been to follow the 95-100 =A, etc. scoring policy or adjust her class grades on a curve to meet the school standard. I would choose to grade on a curve if it were necessary. Since ability levels, culture backgrounds, test validity, reliabilty are all variable, adhering to one rigid scoring standard for everyone would be unfair to students.

Almost 30 percent of the students in the case methods section, howuever, gave well-developed analyses. The following student, for example, identified eight important problems Jan faced:

There are many problems presented in this case. Some of these problems are evident from the first day of school, and then more appear as the semester continues:

(1) Jan is a young, first-year teacher, making her unexperienced and vulnerable.

(2) Jan is starting her first year in a high school with a high demand to send students on to college--a lot of pressure.

(3) The grading system at BHS is different from any Jan is comfortable with, and she is not sure she agrees with it. But, this system was voted in by a teachers' committee, so if she goes against it, she goes against a majority of the teachers.

(This student continues to list five more problems, such as politically influential parents and the need to grade on the basis of objectives.)

This student then lists five options Jan could consider:

Jan Newell's options:

(1) From the start Jan should have decided her grading strategy and then stuck by it through the semester.

(2) She can now talk to several different teachers (not just Frank) and see how they grade. From this gathered information she can decide how to grade from now on.

(3) She can keep her tests tough and insist on students having to put extra effort into her class to get an A or not make them as tough so students can get "good grades." Learning is more important than grading.

(4) She can have the principal explain an acceptable grading system and go by it.

(5) She can go to the teachers' committee and get their opinions and guidelines for grading to keep the consistency within the school.

Conception of the Teacher as a Decision-Making Professional

As I developed the coding guide, I noticed that students differed not only in their abilities to analyze the problem but also in their view of the teacher's decision-making responsibility. This distinction is implicit in the two students above. The first student sees Jan's problem as figuring out what the school's policy is and implementing it. The second student sees Jan as an autonomous professional whose views may differ from the

grading system at BHUS. While I had thought about case methods as developing the "reflective" abilities of a "reflective professional," I had not considered that case methods, with their emphasis on decision-making, might also develop a "professional" orientation. Would students taught by case methods also be more likely to see the teacher as a "professional" rather than as a "follower of school norms and policies"? To test this possibility, this category was added to the coding guide and students' responses were again coded blind after establishing greater than 80 percent interrater reliability.

Of the students taught by case methods, 79 percent viewed the teacher as a professional compared to 58 percent of the discussion methods students (Table 2). This difference did not quite reach conventional levels of statistical significance. Nonetheless, the trend favors the case methods section and raises the possibility that case method teaching may have a subtle effect on professional conceptions of the teacher's role.

Effects of Case Methods with Young and Mature Education Students

When I taught by the case method, my impression was that the more mature students received more benefit. The more mature students seemed to participate more and to bring to the case more interesting ideas. Younger education students, in contrast, seemed to have much more difficulty in thinking about the problems in analytic and imaginative ways.

Analyses showed, however, that younger students gained as much or more from case method instruction as more mature students (Table 3). While 82 percent of the younger students taught by discussion methods were in the lowest category of problem-solving abilities, only 38 percent of the younger students taught by case methods remained in the lowest category. The low level of reasoning skills showed by the younger students in the discussion methods section, however, is consistent with my perception that these students

had more difficulty with cases. The point is, however, that case instruction develops younger education students' analytic skills.

Analytic Reasoning in a Classroom Situation

In order to see if the analytic abilities that case methods classes attempted to develop would transfer from a written problem to an actual classroom situation, students were asked to spend two days observing in classrooms, describe what they saw, and answer a series of analytic questions about the classrooms. In analyzing these data, an unexpected problem became evident. Almost half the students (42 percent) in the discussion methods class ignored the analytic questions---significantly more than the case methods students (p .05).

This result might be an effect of case methods instruction, an indicator of weaker analytic abilities on the part of discussion methods students.

Still, no significant differences between case methods students and discussion methods students were found when students who did not answer the questions were eliminated (Table 4). The results are inconclusive.

Since the evaluation of case method instruction is a new and undeveloped area of research, I want to point out a measurement problem that may have led to these inconclusive results as well. In a study contrasting expert and novice teachers' problem solving, Swanson, O'Conner, & Cooney (1990) point out that expert teachers differed significantly from novices when they were asked to conceptualize and analyze an educational dilemma. However, no significant differences between experts and novices appeared when they were given directive instructions, which broke down the problem solving task into such areas as the identification of assumptions. The questions that I gave case methods and discussion methods students were directive---the questions asked students specifically to identify problems that the teacher faced in the classroom or what

research might have applied. In future evaluations, I would recommend the use of much less direcive questions in the evaluation of students' problem solving abilities.

Attitudes Toward Courses Taught By Case Methods

When I teach through case methods, I typically find the class much more stimulating than when I teach through lecture or discussion of readings. The students invariably bring to a real world case some interesting new perspective or insight, based on their own experience. Since I find case classes more interesting, it is easy to believe that my students do so as well.

The results of this study, however, do not support the conclusion that education students find classes taught by the case method more interesting and satisfying than classes taught by the conventional discussion of readings. When asked if they found the case methods section "interesting and stimulating," a large proportion of the students (82 percent) gave the case methods class the highest possible rating (Table 5). Bu a large majority (75 percent) of students taught by discussion methods, however, also gave the class the highest possible rating.

The type of class that both groups found significantly less interesting and stimulating was the lecture class.

Students in the case methods section did not differ from students in the discussion methods section in absenteeism, in talking about coursework outside of class, or in their evaluations of the entire course on the official university survey form.

These results support what experienced professors know--- fine classes can be taught with many different methods. These results do suggest, however, that case methods are one way of conducting classes that students find very interesting.

A Skeptical Interpretation of These Results

Did students in the case methods section develop greater problem solving skills or did they just develop greater skill in analyzing written cases? What this study shows, a skeptic might say, is that students taught how to analyze cases can indeed analyze cases.

I would argue in response that the ultimate goal is to develop teachers who are analytic about schools and their own practice. I do not know if case methods students will apply these analytic approaches in actual school settings, but I am reasonably confident that most discussion students will not because they they lack the necessary analytic skills.

Conclusion

Case methods increase education students' abilities to spot issues in problematic situations, analyze educational dilemmas in sophisticated ways, and identify possible alternatives for action. Case methods were as successful with young undergraduate students as with mature students with greater life experience.

Most students viewed classes taught by the case method as highly interesting and intellectually stimulating. But students did not rate case methods classes more favorably than conventional discussion classes. Both groups liked small discussion classes significantly more than large lecture classes.

Since close to half the students in the discussion methods section ignored the analytic questions when asked to describe the classrooms they observed, it is not possible to draw any conclusions about whether case methods improved students' abilities to analyze classroom situations. While this failure to answer the analytic questions may be just a methodological problem, it might also be evidence of weaker analytic skills among students who were not taught by case methods.

While these results are inconclusive, if we want students to be able to spot problems, analyze dilemmas, and identify options in the classroom, we may need to develop these abilities using direct experience within classrooms as well as vicarious experience with written cases. The "case method" should be viewed not as a set of curriculum materials but as an approach to professional experience, an attitude of mind.

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Table 1.
Problem-solving Skills of Case Methods Students Compared to Discussion Methods Students:

Problem-solving skills	Case Methods	Discussion Methods
Well-developed	29%	12%
Moderate	43	23
Low	28	65

$p < .05$

N = 28 (case methods)
26 (discussion methods)

Table 2.
Conception of Teacher as Decision-making Professional vs. Follower of School Norms and Policies

Conception of teacher	Case Methods	Discussion Methods
Decision-making professional	79%	58%
Follower of school norms and policies	21	42
	n.s	

N = 28 (case methods)
26 (discussion methods)

Table 3.
Problem-solving Skills of Younger and Mature Students Taught by Case Methods Versus Discussion Methods.

	Younger Students		*Mature Students*	
Problem-solving skills	**Case Methods**	**Discussion Methods**	**Case Methods**	**Discussion Methods**
Well-developed	39%	0%	20%	33%
Moderate	23	18	60	27
Low	38	82	20	53
N=	13	11	15	15
	$p < .01$		$p < .05$	

Table 4.
Analytic Skills of Case Methods Students Compared to Discussion Methods Students: Classroom Observation

Response to structured questions	Case Methods	Discussion Methods	
Ignored analytic questions	23%	42%	$p < .05$
Identified two or more teaching problems on at least one day of observation	45	55	n.s.
Identified two or more learnings from each observation experience	55	55	n.s.
Applied research concepts to observation each day	43	45	n.s.
N answering questions =	**20**	**11**	
Total N =	**23**	**19**	

Table 5.
Attitudes of Case Methods Students Compared to Discussion Methods Students

Find section interesting and stimulating	Case Methods		Discussion Methods
Very much	82%		75%
Somewhat	18		25
Not much	0		0
Not at all	0		0
		n.s.	
Find lecture interesting and stimulating			
Very much	33		56
Somewhat	48		35
Not much	19		9
Not at all	0		0
		n.s.	

N = 22 (case methods)
23 (discussion methods)